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ABSTRACT

In discussing the importance of a competency based approach to teacher education and potential concerns for program integrity, four points are emphasized: (1) In Competency Based Education (CBE), stated competencies define all other program elements; (2) Many programs do not possess internal consistency, integrity, or external validity; (3) CBE provides an opportunity to reconceptualize a total preparation program; and (4) The potential power of CBE is sapped when piecemeal development occurs. Three approaches to improve CBE programs are considered. In the first approach, the perceptions of professionals are employed as the basis for competency identification. The second approach assumes that effective instruction is related to a theoretical position and holds professionals accountable for demonstrating that position. The third approach for specifying competencies is analyzing the role of the teacher to determine the tasks actually performed by practitioners. The strengths and weaknesses of each approach is considered. (JD)

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SPECIFYING AND REFINING COMPETENCIES

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Specifying and Refining Competencies

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Program Integrity

The basic assumption undergirding competency based education is that learning is facilitated when it is based on known and desired objectives. Thus, one of the first stages in the design and development of a CBE program is the specification of competencies. These, in turn, determine appropriate instruction, management, and evaluation procedures. This relationship is illustrated in Figure 1.

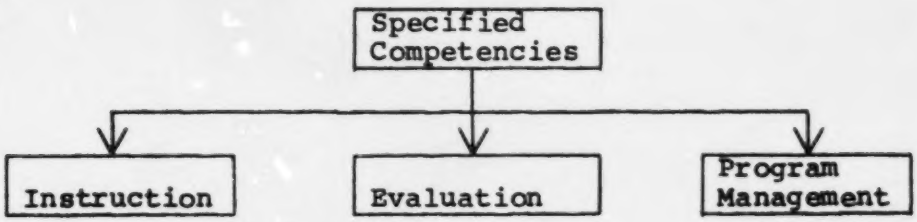

Figure 1

Relation of Competencies to Instruction, Evaluation, and Program Management

The direction of the arrows in Figure 1 suggests two implications: (1) in designing a program, competencies are specified prior to determining instruction, evaluation, and program management; and (2) the content and strategies used in instruction, evaluation, and program management are determined by the extent to which they facilitate learner demonstration of the defined competencies.

Competency Specifications

With the key element in CBE being the set of competencies, the program can be no better than the quality of the competencies it is designed for. The number of lists of competencies seems inexhaustible. Every program generates its own list; Florida compiled a catalog of them, New Jersey involved professional organizations in delineating them, and Pennsylvania projected and refined a set of competencies through extensive state-wide participation.

Researchers have tried with relative unsuccess to tie teacher actions to student outcomes. While several institutions are attempting to build a research base (National Commission on PBE, Far West Lab and California, West Georgia College), most programs continue to formulate competencies from the lore of the profession. What is needed are valid specifications based on logically derived processes.

The sources for competency specifications continues to be a source of concern. Many professional preparation programs have grown and developed over a period of years. Each new instructor, each recent innovation, each newly perceived need, each evolving power struggle has left its mark. This evolutionary process leaves some programs a hodge-podge of overlapping and conflicting theories and contents. Many have no real internal consistency nor integrity. Syllabi and program descriptions are written so as to imply a unity called "program"; but under the veneer of generalized professional jargon lies a host of unresolved conflicts and dilemmas. One concern, then, is for the basic integrity and relevancy of programs.

A second concern derives from another aspect of the evclution of professional education. Less than 100 years ago, teaching was quite different from today, and teacher education was virtually unheard of. Recently, we were reading the diary and papers of my wife's aunt who had taught for more than 60 years in west Texas. When Aunt Gaby was fifteen, the president of one of the three schools in the county heard her teach a Sunday School lesson and promptly offered her a job. The school was half of a two-room dug-out, with the President's family living in the other half. A school term was three months. Three of her 20 students were older than she. Aunt Gaby was smart, but had no training. To be certified, she went to the County Judge, an old man of 24 who asked her several questions while shining his boots for a date. When the boots were polished, Aunt Gaby was certified. Later she attended a County Normal School, and was granted a permanent, life-time certificate to teach any subject at any grade level.

In the evolution of teacher education, Normal Schools became State Teachers Colleges, then State Colleges, finally State Universities. The pattern has been repeated all across the country. With the increased prestige of university status, with a more extensive training period, with the movement from craft to profession, teacher education began more and more to emphasize theory. This has been a positive development; we learned from the medical profession that advanced training is necessary to improved professional status. But it also has led to irrelevant parts of the preparation program as teacher educators adopted the values of their academic colleagues, as academic knowledge was extended to the detriment of practical experiences, and as the

publish or perish philosophy sunk deep roots into the professor reward system.

A third concern grows from the concept of academic freedom. I am not suggesting that this long revered symbol of academic independence be discarded, but it is a practice with mixed blessings in professional schools. Faculty have taught what was important to them, not necessarity what the learner deemed important or what was called for by the professional role for which students were being trained. This has, all too often, decreased the continuity and integrity of preparation programs.

These three factors--lack of program integrity and relevancy, change in emphasis toward more academic pursuits, and instructor autonomy--are among several factors leading to less than effective training programs. Periodically, institutions need to reexamine their mission in society and to reconceptualize their programs, management, and activities.

A major promise of competency based education lies in this potential for reconceptualization of professional education. CBE provides an opportunity for a total design of a program. CBE encourages designers to step back from the activities of instruction to examine the underlying precepts and goals sought by the program by comparing them to the reality context in which they operate. CBE encourages designers to integrate program elements, to consider the outcomes expected.

A second promise of CBE is that it presses for such an examination to focus on students rather than programmatic or instructor needs. Objectives for the program, stated as learner competencies form the basis for further efforts. The student in a CBE program is of foremost importance. Third, CBE focuses on actual and changing needs of practitioners, not on content that was important to the instructor or that had traditionally been included in the program.

In suggesting the importance of a CBE approach and potential concerns for program integrity, four points have been emphasized:

(1) in CBE, stated competencies define all other program elements--instruction, evaluation, and program management;

(2) many preparation programs, evolving from numerous minor changes, do not possess internal consistency or integrity nor external validity;

(3) CBE provides an opportunity to reconceptualize a total preparation program; and

(4) the potential power of CBE is sapped when piece-meal development occurs.

Three approaches that promise the power required to further improve professional preparation programs are discussed in succeeding sections: (1) Perceptual Basis; (2) Conceptual Models; and (3) Task Analyses. Each has its own basis premises, approaches, strengths and shortcomings.

Perception As A Basis For Deriving Competencies

In this approach, the perceptions of professionals are employed as the basis for competency identification. The approach may be as simple as asking a group of practitioners to discuss competencies they consider important, and then listing and ordering them. It can be a complex and sophisticated procedure.

Comprehensive Survey

Edward Meyen and his colleagues at the University of Missouri[1] designed a prototype training program for preparing curriculum consultants for exceptional children that employed a perceptual base. Their procedures suggest a viable approach for others.

To develop the initial pool of competencies, Meyen and his colleagues interviewed 30 educators in various administrative and instructional positions. In these interviews, the roles and functions of the curriculum consultant were discussed. Functions were probed in the interview to determine specific activities, interrelations, and needed knowledge and skills. Approximately 400 competency statements resulted from these interviews.

In the second stage of the project, a model was designed as a means for organizing competencies, analyzing them, and serving as a frame of reference. The three-dimensional model permitted the analysis of functions by examining (1) the areas for which the curriculum consultant is typically held responsible; (2) the extensiveness of situations within which he works; and (3) the process skills he typically employs. These three dimensions are illustrated in Figure 2.

The model shown in Figure 2 "served a useful purpose in organizing the universe of competency statements."[2] The staff used it as a guide in catagorizing competencies. This process tended to broaden the competency spectrum to include competencies that ranged from tangential through direct application to the role of the curriculum consultant. In a third stage, using their own experience as a base,

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[1]Edward L. Meyen, et. al. Interim Report: Competency Research Phase, Special Project: Prototype Training Program for the Preparation of Curriculum Consultants for Exceptional Children. (Columbia: University of Missouri, November, 1971).

[2]Ibid, P. 36.

and redundancy and relevancy as criteria, the staff analyzed and refined the 400 statements derived from the matrix, reducing the number to 150.

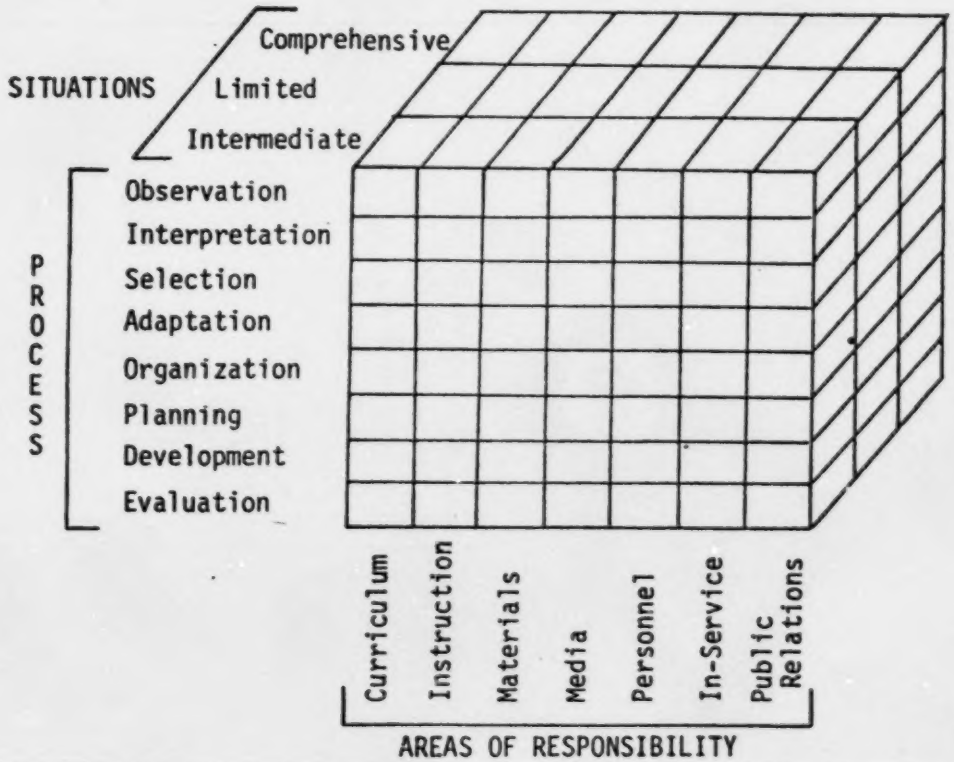

Figure 2

Competency Organization and Generation Model

A pilot study further refined the competency statements. An instrument, composed of the 150 competency statements, was administered to 125 professional staff members in four school districts. Respondents were asked to rate each competency as to importance and trainability. Based on an analysis of results of the pilot study, the instrument was refined to include 100 competency statements.

The final stage for competency specification was composed of a comprehensive survey and an analysis of the survey results. A sample of local and intermediate school districts of varied sizes was selected and a sample of administrative and teaching positions within each district was drawn. A total sample of 587 subjects responded to the survey. Respondents rated each of the 100 competency statements as to its importance and trainability.

Concurrent with the last stage, the 100 competency statements were clustered by function and context. Seven judges applied a modified Q-sort, distributing each of the competencies to one of the cells in the matrix illustrated in Figure 3. The subsequent organization afforded by this matrix was employed in clustering competencies for instruction and assessment.

CONTEXTS

FUNCTIONS	Curriculum	Instruction	Materials and Media	Communi-cation Processes	Support Systems
Evaluating					
Developing					
Training					
Advising					
Serving as Liaison					

Figure 3

Function and Context Matrix

Delphi Technique

A very different approach that used perceptions to identify competencies may be illustrated by the study of competencies in mathematics education by Underhill and Houston. In the first round of the Delphi, a long list of competency specifications was mailed to 65 mathematics educators from across the United States who were asked to refine, add, and delete statements and to recommend changes for clarity. The responses from Round One were used to refine the competency list. The refined list was mailed to participants as Round Two with the request that they rate each statement as to its importance in teaching mathematics.

The scale for rating each competency was:

1 = essential for initial certification

2 = important but not essential for initial certification

3 = moderately important

4 = relatively unimportant

5 = immaterial

In the third round of the Delphi, each participant was reminded of his previous response to each statement as well as the mean responses of the total group to each statement. In this round, participants could change from their previous rating in view of their knowledge of the group mean, or, if they chose to maintain their previous position, justify their rating. The final report listed 80 competencies and included the adjusted means from Round Three.

The Delphi technique permitted a number of people from widely dispersed areas but a singular interest in the study to interact and contribute to a refining process. Since the data were from professional mathematics educators, this was a perceptual study using expert opinion.

Conceptual Models As A Basis For Determining Competencies

The second approach to specifying competencies assumes that effective instruction is related to a theoretical position and holds professionals accountable for demonstrating that position. Varied conceptual models result in different sets of competency specifications.

The Michigan State University elementary model was based on the hypothesis that teachers would be effective to the extent they are (1) students of human behavior, that is, practicing behavioral

scientists; and (2) rational decision makers.[3] The Michigan State staff identified specific assumptions upon which the program was based, theoretical constructs supporting it, competencies deductively derived from the conceptual model, and then designed instruction to prepare teachers who were practicing behavioral scientists employing a rational decisioning model.

Joyce and Weil identified sixteen conceptual models in Models of Teaching.[4] Their models provide viable paradigms for this approach to competency specification. One will be used to illustrate the approach.[5]

Social Inquiry developed around concepts of social and democratic processes. This model, best associated with the work of Massiales and Cox,[6] takes the position that the school should be concerned with the serious and critical areas of public controversy. Sample teacher competencies associated with this position are listed below.

The Teacher:

1. Identifies goals and objectives appropriate to student needs;

2. Presents instruction using inductive and deductive procedures; and

3. Uses positive reinforcement patterns with students.

While these same competencies might be applicable to many other models, the sub-competencies more explicitly noted below reflect the values in this conceptual model.

The Teacher:

1.1 Identifies social problems or issues meaningful to students;

2.1 Helps students to explore hypotheses and to assess their validity based on gathered evidence;

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[3]W. Robert Houston, ed. Behavioral Science Elementary Teacher Education Program, Final Report, USOE Project No. 8-9025 (East Lansing: Michigan State University, 1968).

[4]Bruce Joyce and Marsha Weil, Models of Teaching, (Englewood Cliffs, N.J.: Prentice Hall, 1972).

[5]This portion of the paper was adapted from a training manual, W. Robert Houston and Howard L. Jones, Relation of Theory, Competence, and Assessment, (Washington, D.C.: American Association of Colleges for Teacher Education, 1974).

[6]Byron Massiales and Benjamin Cox, Inquiry in Social Studies, (New York: McGraw Hill, 1966).

2.2 Asks probing questions to reflect ideas and values of students;

3.1 Uses appropriate reinforcement strategies with students based on lesson objectives and student background.

In this model, the teacher acts as a sharpener, focuser, and counselor to inquiry as students focus on social issues, develop hypothetical solutions, explore solutions, and gather facts to support or reject the solutions. The first of the sample sub-competencies listed above, "1.1 Identifies social problems or issues meaningful to students" is related to Competency 1. This sub-competency is integral to the first step in most social inquiry lessons where the teacher has students focus on some dilemma, perhaps some controversial issue such as race relations, the energy crisis, over-population, or the food shortage. The teacher then guides students in generating a number of hypotheses to explore, pushes students toward clear definitions; teaches them to gather facts or other supportive data, and encourages students to draw conclusions from social data.

Competencies for the Social Inquiry model differ from those, for example, stated for the Advance Organizer model espoused by David Ausubel.[7] The latter conceptual model assumes that each discipline includes a set of basic concepts and principles, focuses student attention on key ideas or organizers and then has students relate cognitive information to be studied to the organizers. The resulting teacher competencies could be similar to those included for other models, but their sub-competencies and assessment procedures would be quite different. For Competency 1, "Identifies goals and objectives appropriate to student needs", student needs would be defined in terms of student achievement with respect to a continuum of knowledge. With the Social Inquiry model, need is defined in terms of social problems or issues; with the Advance Organizer model, it is defined in terms of the logical sequence of the content in a discipline. With the latter, the purpose is to increase the efficiency of information processing capabilities by structuring the flow of cognitive knowledge. Thus, the competency related to objectives takes on a different meaning and requirements.

Each conceptual model has its own integrity--its own set of assumptions, values, parameters, and operating procedures. It is logical to assume, then, that teachers would demonstrate different sets of competencies with each model. It is also logical to assume that preparation programs would consciously and explicitly select and develop one or more models as the basis for development.

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[7] David Ausubel, The Psychology of Meaningful Verbal Learning, (New York: Greene and Stratton, 1963).

Task Analysis As A Basis For Specifying Competencies

This third approach to identifying competencies can be relatively simple or extremely complex. The more complex uses of task analysis have been by the military and by industry. Using this approach, each professional role is analyzed to determine the tasks performed by practitioners. These are synthesized into competency statements. The R & D Center for Vocational and Technical Education at The Ohio State University used this approach to identify 386 competencies common to vocational-technical education teachers. The Universities of Georgia, Toledo, and Houston are among those who have designed programs based on a similar task analysis of teaching. Several approaches will be illustrated, including the range of complexities.

Teachers may be observed to determine precisely what tasks they perform. These observation records are then analyzed and a teacher preparation curriculum based on that analysis. Hours of observation are required to collect data, which may be written and translated into competencies through a three-column instrument.

Observations	Notes on Observations	Demonstrated Competencies

Figure 4

Task Analysis Observation Schedule

The first column includes a running diary of precisely what the teacher did; e.g., wrote day's assignments on chalkboard, signed absence slip for child, explained assignments to total class, called first group to reading circle, answered child's questions about mathematics lesson, introduced new vocabulary words to reading group, and so on. The second column includes notes by the observer on the teacher's actions--possible causes for the actions, what children were doing, comments, explanations, and speculations which clarify the observations. In the third column, on-site observations and notes are translated into competencies and instructional objectives. Teacher educators may make the observations outlined above, or they may draw from observations of students, trained observers, or others.

A second procedure for making a task analysis requests teachers to reconstruct their daily activities through an Activity Log, and to identify major competencies imbedded in those activities.

The third procedure for task analysis is more detailed. A task, as defined in this approach, "is a series or set of work activities (elements) that are needed to produce an identifiable output that can be independently consumed or used, or that can be used as an input in a further stage of production by an individual who may or may not be the performer of the task".[8] The Health Service Mobility Study used task analysis to generate competencies and curricula for persons entering the health professions. The HSMS staff did not simply collect lists of tasks; they described and analyzed the tasks using the Task Identification Summary Sheet illustrated in Figure 5.

SAMPLE TASK IDENTIFICATION SUMMARY SHEET

This is task 1 of 18 for this performer.
Code 328 This is page 1 of 2 for this task.

Performer's Name_____ Analyst(s)_____ Dept Diag.x-ray
Job Title_____ Institution_____ Date 3/73

1. What is the output of this task? (Be sure this is broad enough to be repeatable.)	List Elements Fully
Decision made on whether to order lymphangiography and/or alternative study; recommendations made on technique; record entered and placed for scheduling.	Performer decides whether to schedule lymphangiography (or lymphography: radiographic evaluation of lymphatic vessels and nodes) and/or alternative studies upon receiving an x-ray requisition form or a request by phone or in person from a referring physician. Request may be for use in initial diagnosis or after an earlier procedure has uncovered a suspected pathological condition.
2. What is used in performing this task? (Note if only certain items must be used. If there is choice, include everything or the kinds of things chosen among.)	1. Performer reads the x-ray requisition form and the patient's history to learn the nature of the problem and the reason for the request.
X-ray requisition form and patient's chart; relevant radiographic materials; telephone; view boxes	

Figure 5

HSMS Task Identification Sheet

[8] Christina Gullion and Eleanor Gilpatrick, The Design of Curriculum Guidelines for Educational Ladders Using Task Data, Working Paper No. 11, Health Services Mobility Study (New York: Hunter College, 1973) pp. A1-2.

	a. If the condition or the nature of the request warrants, performer discusses request with patient's attending physician. b. Performer studies any radiographic materials resulting from procedures already carried out, current, or on file, and/or interpretations already available relating to the radiographs. (Performer views radiographs on view boxes.) c. If the performer finds that the information provided is inadequate, performer arranges to have other materials sent or discusses with relevant physician. d. Performer decides whether there are contraindications to the procedure requested such as adverse OK - RP;RR
3. Is there a recipient, respondent or co-worker involved in the task? Yes...(X) No...( ) 4. If "Yes" to q. 3: Name the kind of recipient, respondent or co-worker involved, with descriptions to indicate the relevant condition; include the kind with whom the performer is not allowed to deal if relevant to knowledge requirements or legal restrictions. Physician requesting lymphangiography; clinician; secretary or clerk	
5. Name the task so that the answers to questions 1-4 are reflected. Underline essential words. Deciding whether to order lymphangiography of any patient or alternative studies and recommending technique, in consultation with referring physician, by reviewing case history and relevant materials; discussing, recommending studies to be done and technique; recording; arranging for scheduling.	6. Check here if this is a master sheet..(X)

This is task 1 of 18 for this performer.
This is page 2 of 2 for this task.

Performer's Name _____ Analyst(s) _____ Dept. Diag.x-ray
Job Title _____ Institution _____ Date 3/73

List Elements Fully	List Elements Fully
reactions to prior studies or allergies, and considers these in relation to the request. 2. Performer decides whether to approve request, order additional or alternative studies, reorder earlier studies or recommend no radiography, based on the information obtained.	

Figure 5 (Continued)

3. If performer recommends against all radiography, discusses with ordering physician and writes reasons on patient's chart.	
4. If performer and physician agree on initial request or on additional or alternative studies, performer writes what was decided on the patient's chart.	
5. If radiography is to be ordered, performer decides on what type of study to recommend, and technique, if appropriate, such as entry site for contrast medium, anesthetic, and area to be radiographed. Performer writes orders and recommendations in patient's chart explicitly so that nurses, technologists, residents and other personnel can prepare patient or be scheduled for work.	
6. Performer gives information to secretary for scheduling. Signs requisition sheet if appropriate.	

Figure 5 (Continued)

In writing task descripions, whether as comprehensive as in the HSMS recommendations or in a different format, several guidelines may apply. These have been adapted from recommendations by Melching and Borcher.[9]

1. The statement is clear and easily understood by the professional in that role.

2. The statement uses terminology that is consistent with current usage in the professional field.

3. The statement is brief to save reading time.

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[9]William H. Melching and Sidney D. Borcher, Procedures for Constructing and Using Task Inventories (Columbus: Center for Vocational and Technical Education, the Ohio State University, 1973), pp. 16-18.

4. The statement is clearly written so that it has the same meaning for all professionals in the area.

5. Abbreviations are used cautiously, if at all, since they may not be understood by all professionals in the particular field.

6. Vague or ambiguous words, such as "coordinate", "recommend", "determine", "understand", "assure" should be avoided.

7. Short words should be used in preference to long words or expressions.

8. Qualifications such as intelligence, aptitude, knowledge, education, etc., are not tasks and are not included in the task section of the inventory.

9. The statement begins with the present tense action word with the subject "I" understood. Each statement must be specific and capable of standing alone.

10. The statement must be a complete sentence.

11. Avoid multiple verbs such as "teach and assess".

Once the tasks are analyzed, they are translated into competency statements. Ammerman suggested several factors to be considered in this process.[10]

1. How often each task is performed by a job incumbent.

2. How often each task should be performed.

3. Proportion of job incumbents concerned with each task.

4. Importance of each task to effective (business) operation.

5. Existence of a discrepancy between what is done and what should be done by job incumbents.

6. How soon task competence is expected after job assignment.

7. Tasks for which all essential learning can be, and is being adequately acquired on the job in the time available.

8. Tasks for which all essential learning has occurred prior to school attendance.

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[10]Harry L. Ammerman, Development of Procedures for Deriving Training Objectives for Junior Officer Jobs, Technical Paper 66-3, (Fort Bliss, Texas: Human Resources Research Organization, 1966).

9. Tasks on which job incumbents are having difficulty in acquiring competence on the job.

10. Tasks for which training difficulties are being experienced.

11. Tasks for which procedures could be improved through school training efforts.

Other Approaches For Identifying Competencies

There are still other approaches to competency identification; some are more viable, others appear to be simply expedient.

1. Course Translation. The staff simply reformulates requirements of current courses into competency statements without reconceptualizing the program or the relevancy of content or approaches employed in the course for the roles of the teacher.

2. Use of Other Lists. The staff relies for its initial input on work previously done in the field. They collect the competency specifications formulated by other programs and either use them as they are or modify them for their particular needs.

3. Negotiation. This approach may be linked with any other, but is distinguished by the procedures used in final determination of competencies. The staff typically sit around a table discussing, editing, and modifying competencies. The persons with the more persuasive arguments, tenaciousness, loudest voices, or sharpest editing skills likely prevail in the final listing.

4. Needs of School Learners. The teacher preparation program is based on a process that begins by identifying the needs, values, and perspectives of learners. Then the kind of school organization and program is described that facilitates achievement of these goals. Third, personnel needs for such a school are specified, and from this, teacher competencies are identified. The long, systematic process is rooted in the basic purpose for teachers being competent in the first place--to help learners.

5. Needs Assessment is similar to the last approach, in that it too examines the consequences of teacher action and then formulates a teacher education program to prepare people to cope with those consequences. This approach adds a step to the process outlined in the "Needs of School Learners" approach; it begins by assessing the needs of society and of a particular community before speculating on student needs and values.

Speculation

Which approach should be used? The answer to this question varies from program to program. Each has its own integrity, its own promises and strengths, its own demands and weaknesses. While most programs have relied on several approaches, some will use only one. It is important not simply to generate a set of competencies, but to do so logically and on a rational basis; to select deliberately an approach that meets programmatic needs and requirements. Because of the emphasis on competencies in a CBE program, this stage in the development process is too important not to be emphasized and carried out effectively. A CBE program can be no better than the competencies it specifies, for they determine the context for all else.